

Free flaps for head and neck cancer reconstruction: Does the use of both large cervical vessels as recipient vessels and the employment of end-to-side technique enhance flap survival?

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This study specifically investigates whether the use of both large cervical vessels (the external carotid artery and the internal jugular vein) as recipient vessels with end-to-side anastomosis enhance free flap survival in head and neck cancer reconstruction, when compared with the use of other standard smaller neck recipient vessels and end-to-end anastomosis. A total of 84 consecutive patients were included and were divided into two groups (42 in each group) according to the recipient vessels. The overall vessel thrombosis rate was 6% (five of 84 cases) and the overall flap loss rate was 2.4% (two of 84 cases) yielding a flap salvage rate of 60%. Vessel thrombosis occurred in three cases of the smaller vessels group and in two cases of the large cervical vessels group. This was not statistically significant.

Key Words: *End-to-side recipient vessels; Free flap; Head and neck large cervical vessels*

Des lambeaux libres pour la reconstruction de la tête et du cou en cas de cancer : L'utilisation des deux gros vaisseaux cervicaux comme vaisseaux récepteurs et le recours à la technique termino-latérale améliorent-ils la survie du lambeau ?

La présente étude évalue si l'utilisation des deux vaisseaux cervicaux (l'artère carotide externe et la veine jugulaire interne) comme vaisseaux récepteurs avec une anastomose termino-latérale améliore la survie des lambeaux libres en cas de reconstruction de la tête et du cou par suite d'un cancer, par rapport au recours habituel à d'autres vaisseaux récepteurs du cou, plus petits, et à une anastomose termino-terminale. Au total, 84 patients consécutifs ont participé à l'étude et ont été divisés en deux groupes (42 par groupe), selon les vaisseaux récepteurs. Le taux global de thrombose des vaisseaux s'est élevé à 6 % (cinq cas sur 84), et celui de perte des lambeaux, à 2,4 % (deux cas sur 84), laissant place à un taux de sauvegarde des lambeaux de 60 %. Une thrombose des vaisseaux s'est produite dans trois cas au sein du groupe de patients chez qui on avait utilisé les petits vaisseaux, et dans deux cas au sein de celui chez qui ont avait recouru aux gros vaisseaux. Ces résultats n'étaient pas statistiquement significatifs.

The King Faisal Specialist Hospital in Riyadh, Saudi Arabia is a tertiary referral center for head and neck cancer and has a well established reconstructive microsurgical unit.

In the present paper, a total of 84 consecutive free flaps for head and neck reconstruction were reviewed to study whether flap survival is enhanced with the use of both large cervical blood vessels as recipient vessels and employing the end-to-side technique.

PATIENTS AND METHODS

The author used two different sets of recipient blood vessels for head and neck free flaps. The first is the standard smaller vessel (facial, superior thyroid or lingual artery as recipient arteries and a branch of jugular system or any other suitable vein such as the facial, or superior thyroidal vein as recipient veins). Microsurgical anastomosis between flap vessels and these smaller recipient vessels was performed using the end-to-end technique.

The second set of recipient blood vessels were the two large cervical vessels (external carotid artery and internal jugular vein) and in these cases the end-to-side technique was employed.

A total of 84 consecutive patients who underwent free flaps for head and neck cancer reconstruction were included in the study and were divided into two groups. In group I (42 patients) the standard smaller vessels were used as recipient vessels and the end-to-end technique was employed for the microanastomosis. In group II (42 patients), the two large cervical vessels were used and the end-to-side technique was employed.

Age, sex, type of flap and postoperative complications were compared for both groups, with particular attention paid to the incidence of vascular thrombosis in each group. χ^2 analysis and Fischer's test were used to test for statistical significance.

RESULTS

The mean age, sex and type of flap for both groups were similar (Table 1). More than 90% of all patients had squamous cell carcinoma and the sites of the defects were most often in the intraoral soft tissue, followed by the mandible. This was reflected in the type of flap used for both groups. Generally, the author used the radial forearm flap for intraoral soft tissue defects, the fibula for mandibular defects and the rectus abdominus or latissimus dorsi for major glossectomy and maxil-

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TABLE 1
Age, sex, type of flap used in the two groups studied

	Age	Sex	Type of free flap utilized
Group I (n=42) (smaller neck recipient vessels with end-to-end anastomosis)	Mean age 45 years (range six to 73 years)	25 males, 17 females	Radial forearm (26 cases) Fibula (11 cases) Rectus abdominus (3 cases) Latissimus dorsi (2 cases)
Group II (n=42) (large cervical recipient vessels with end-to-side anastomosis)	Mean age 48 years (range 14 to 77 years)	27 males, 15 females	Radial forearm (30 cases) Fibula (6 cases) Rectus Abdominus (4 cases) Latissimus dorsi (2 cases)

TABLE 2
The overall thrombosis and flap loss rates in various series in the literature

Author (reference)	n	Thrombosis rate (%)	Flap loss rate (%)	Flap salvage rate (%)
Schusterman et al (1)	308	6.8	5.5	19
Kouri et al (5)	135	9.6	5.9	50
Hidalgo and Jones (6)	150	9	2	80
Current series	84	6	2.4	60

lectomy defects. All cases and their microanastomosis were performed either by the author or under his direct supervision. Furthermore, no vein grafts were used in this series. One major postoperative complication occurred in each group. One patient in group I developed hemiplegia, while another in group II developed a compartment syndrome in the leg after harvesting a fibula osteocutaneous flap with primary closure of the donor site. There has been no perioperative mortality in this series and minor postoperative complications (such as small hematomas and seromas not requiring drainage, minor infection responding to antibiotics, minor fistulae responding to conservative therapy and minor delayed healing at the donor site) were not significantly different between the two groups.

The overall vessel thrombosis rate was 6% (five out of 84 cases) and the overall flap loss rate was 2.4% (two out of 84 cases) yielding a flap salvage rate of 60%. Vessel thrombosis occurred in three cases of group I patients and two cases of group II patients. This was not statistically significant.

DISCUSSION

The author could not find a paper in the English literature specifically investigating whether the use of large cervical vessels as recipient vessels actually enhances flap survival. Schusterman et al (1) mostly used large cervical vessels and believed that this might enhance flap survival; however, they did not specifically investigate this factor in their study. Although we did not find this factor to significantly enhance flap survival, we currently prefer to use the large cervical vessels mainly because it leaves more time for reconstruction. In our center, as the ENT team performs the resection, we rou-

tinely elevate the free flap (slightly larger than the expected defect), let it perfuse in the donor site and partially close the donor site. Once resection is complete, the reconstructive team prepares the recipient vessels. This step is essentially eliminated when the large cervical vessels are used. The amount of time taken to perform end-to-end and end-to-side anastomosis is more or less the same.

In our series, the radial forearm and fibula flaps were the two most commonly used flaps. First described by Song et al (2), the forearm flap has become the workhorse for intraoral soft tissue reconstruction. The flap is thin, potentially sensate and has large donor vessels. Similarly, the fibula has become the preferred tissue for use in the microsurgical reconstruction of the mandible because of its description by Hidalgo (3).

In the current series, no perioperative mortality was seen, which is probably attributed to the fact that most of our patients had primary reconstruction and were relatively young and healthy (mean age in the 40s). In Saudi Arabia, intraoral cancer is commonly encountered in younger patients who use the Shama plant (produces slight euphoria) by putting it under the tongue or in the corner of the mouth for several hours everyday. Finical et al (4) recently reported on 121 patients who underwent free flaps for reconstruction of defects in recurring head and neck cancer. The study population was significantly older, had significantly premorbid medical problems, the defects were relatively larger and operative times were significantly prolonged. In that series there was a 14% free flap loss and the rate of perioperative mortality was 4%.

Finally, our overall vessel thrombosis rate of 6% and flap loss rate of 2.4% are comparable to other series in the literature (Table 2).

REFERENCES

- Schusterman MA, Miller MJ, Reece GP, Kroll SS, March M, Goepfert H. A single center's experience with 308 free flaps for repair of head and neck cancer defects. *Plast Reconstr Surg* 1994;93:472-8.
- Sang R, Gao Y, Sang Y, Yu Y, Sang Y. The forearm flap. *Clin Plast Surg* 1982;9:21-8.
- Hidalgo DA. Fibula free flap: A new method of mandibular reconstruction. *Plast Reconstr Surg* 1989;84:71-9.
- Finical SJ, Daubek WG, Yugueros P, Johnson CH. The fate of free flaps used to reconstruct defects in recurrent head and neck cancers. *Plast Reconstr Surg* 2001;107:1363-6.
- Kouri RK, Cooley BC, Kurselman AR, et al. A prospective study of microvascular free flap surgery and outcome. *Plast Reconstr Surg* 1998;102:711-20.
- Hidalgo DA, Jones CS. The role of emergent exploration in free tissue transfer. A review of 150 consecutive cases. *Plast Reconstr Surg* 1990;86:492-8.